Assessment of Subsurface Drainage and Fertilizer Management Practices to Reduce Nutrient Loadings using AnnAGNPS

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The Future Midwest Landscape (FML) project is part of the US Environmental Protection Agency (EPA)'s new Ecological Service Research Program (ESRP), undertaken to examine the variety of ways in which landscapes that include crop lands, conservation areas, wetlands, lakes, and streams affect human well-being. The goal of the FML project is to quantify current and future landscape services across the region and examine changes expected to occur as a result of the growing demand for biofuels. This study is one of several pilots taking place under the umbrella of the FML research project. The overall objective of this study is to assess the agricultural management alternatives for nutrient loading reduction. To achieve the overall objective of this study, USDA Annualized Agricultural Non-Point Source Pollution (AnnAGNPS) model was applied to the Ohio Upper Auglaize watershed, which is located in the southern portion of the Maumee River Basin. This watershed is also part of the USDA-NRCS Conservation Effects Assessment Project (CEAP) Special Emphasis effort with the objective to assess the effects of agricultural conservation practices on water quality. The

85,812-ha watershed drains to Lake Erie, which has serious eutrophication problems due to high nutrient loadings to the lake from several watersheds. Reducing nutrient loadings from agricultural fields is important for water quality improvement. In this study, nitrogen and phosphorus loadings from the watershed first were simulated based on current landuse and projected future landuse conditions; and then the effects of various subsurface drainage and fertilizer management practices on nitrogen and phosphorus loadings were assessed. Drainage and fertilizer management practices can be used to reduce nutrient loadings from the watershed based on AnnAGNPS's evaluation.

Keywords: Future Midwest Landscape study; AnnAGNPS watershed modeling; nitrogen and phosphorus loading; conservation practices assessment; subsurface drainage management.